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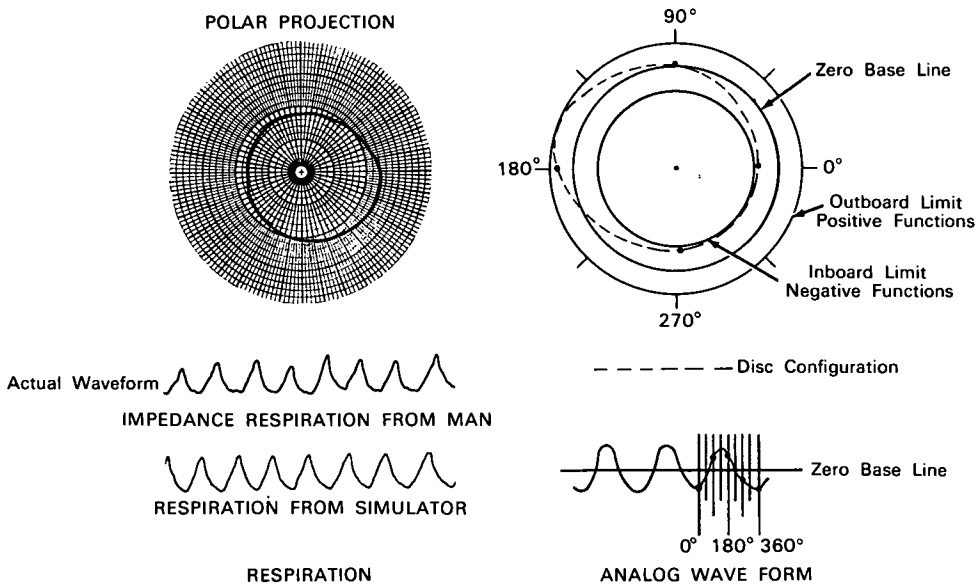
NASA TECH BRIEF

This NASA Tech Brief is issued by the Technology Utilization Division to acquaint industry with the technical content of an innovation derived from the space program.

Analog Device Simulates Physiological Waveforms



The problem: When bandwidth of a telemetry modulation system is reduced, degradation of physiological signal parameter may not be detected. Frequent evaluation of the telemetry modulation system is necessary to allow for such degradation in analyzing physiological signal inputs.

The solution: An analog physiological simulator that generates waveforms representative of a wide range of physiological conditions. These waveforms can be displayed for direct comparison with those displayed from telemetry system inputs.

How it's done: The system is comprised of a light source, a rotating opaque disc with a polar projection of the waveform to be generated cut out along its periphery, and a phototube detector. The detector window is masked so that only a very narrow slit remains for the light to pass through. The waveform to be reproduced is projected on the disc by plotting the values of the waveform on the linear scale as a function of each cardinal angular position. Because the active window of the detector is 1/2-inch long, the zero baseline is 1/4 inch from the edge of the disc. All positive values of the waveforms are projected toward the disc edge; all negative values are projected inboard from the zero base line toward a point 1/4 inch away. When the waveform is plotted on the disc, the disc is cut to its contour.

Notes:

1. This device can be used as a signal generator when testing medical equipment used to record physiological processes.

(continued overleaf)

2. The simulator can produce any physiological waveform, normal or abnormal, from a disc patterned after an actual sample waveform produced by a human or animal. The simulator is not restricted to biomedical use, but will reproduce any complex waveform that has a periodic function, provided the cyclic frequency of the waveform does not exceed the speed of the drive motor.

3. Inquiries concerning this innovation may be directed to:

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Patent status: NASA encourages commercial use of this innovation. No patent action is contemplated.

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